to strike the buoy suspended with a wooden mallet.

I also propose, where it may be required, to attach a little mast to coast or other buoys, which may carry a vane, with the soundings, bearings, and distances of the neighbouring buoys, or any other notice, and particular buoys, where and when this may be desirable, may carry a lamp or lamps attached to their masts, or they may be particularly adapted and constructed in the upper part of the buoy; for that purpose, the buoys before described may be employed for every purpose for which buoys have hitherto been used, but the following improvements are of more general application. Great inconvenience has often been experienced by mariners, from the circumstance of the buoy-rope getting foul of the anchor at low water; and it has hitherto been found impracticable to place buoys with chains in water of more than a certain depth, owing to the weight of the chains when of length sufficient to reach to great depths. Both of these evils are remedied by the application of my invention now to be described; that is to say, to prevent a ship's buoy rope from getting foul of the anchor, I attach to the buoy rope, any where near its middle, another buoy, which I call the secondary buoy or carrier, and which, by its buoyant effort to reach the surface, keeps the lower part of the buoy rope constantly upon the stretch. In like manner, to float a heavy chain in great depth, I attach to different parts of the chain below the main, a buoy secondary or carrier, of sufficient capacity to maintain respectively that portion of chain which is between carrier and carrier. These carriers may in some cases be made of wood, like the buoys in common use, or of any other buoyant substance, but I prefer them to be made of metal. I also obviate the difficulty of placing long chains in deep water, by making the chain itself buoyant, that is, at certain distances in the chain I interpose, as substituted for links, carrier buoys, furnished with rings at both ends, to facilitate their junction with the different portions of the chain, and which portions of chain may be composed of long rods, with eyes or rings at each end; or I substitute for the chains in use, chains composed of portions of hollow cylinders or prisms, of convenient length, attached to each other in succession by rings, chains, links, or any other suitable contrivance, taking care that the buoyant capacity of those portions of cylinders or prisms be at least sufficient to maintain themselves, and the interposed rings or other contrivance made use of to join them. These buoyant chains present also another advantage, which is of some importance: they may be made of such a diameter as to prevent the possibility of their getting entangled between the rudder and stern parts of ships, that happen to come in contact with them. And, lastly, I propose some time to construct my buoys of leather, either with or without internal supports, made of metal or of wood, or both combined, provided the same shall not have been done before.

In witness whereof, &c.

Improvement in the Aquatinta Process, by which pen, pencil, and chalk drawings can be imitated; by Mr. John Hassel, of Clement's-inn.

Perceiving the various methods of imitating drawings and sketches in the graphic art fall short of an accurate imitation of the black-lead pencil, I determined on an attempt,

some years since, which, after repeated experiments, I flatter myself I have fully established.

The manner is totally new, and solely my own invention. By the method I adopt, any artist can sketch with a black-lead pencil his subject immediately on the copper, and so simple and easy is its stile, that an artist can do it with five minutes study.

By this manner, the trouble in tracing on oil paper, and other re-traeing on the etching ground is avoided, and the doubtful handling of an etching-needle is done away, as the pencilling on the copper is visible in the smallest touch. It has also another perfection, that by using a broader instrument, it will represent black chalk, a specimen of which I procured Mr. Munn, the landscape-painter, to make a trial of. (The specimen was sent to the society, and Mr. Munn's name is affixed to the same.) This subject he actually drew upon copper, under my inspection, in less than twenty minutes, the time he would have taken, perhaps, to do the same on paper; in fact, it can be as rapidly executed on copper as on paper.

It is particularly pleasant for colouring up, to imitate drawings, as the lines are soft, and blend in with the colour. It is a circumstance always objectionable in the common method of etching, that those so tinted can never be sufficiently drowned nor destroyed, and always present a wiry hard effect.

It is equally adapted to historical sketching, and might be the means of inducing many of our eminent painters to hand down to posterity their sketches, which, at present, they decline from the irksome trouble attending the repetition of re-tracing their performances, and the doubtful handling of the etching-needle, which can never give a sufficient breadth and scope to their abilities.

I have forwarded in an annexed paper the different specimens for the inspection of the gentlemen forming the Society of Arts, &c.

In making my specimens, I have thought it necessary to show, that if by any accident a part might fail, that it could be retouched a second time, and oftener if wanted; in this particular its simplicity stamps its use.

To elucidate the foregoing proposition, I purposely caused a part of the distance to fail in specimen A A; this is repaired in specimen B, and the sharp touches wanted to perfect the sketch are added.

I beg also to state, it is not the style usually termed *soft ground etching*: that process is always uncertain, cannot be repaired, and will only print about two hundred impressions; whereas the specimens herewith sent, will print upwards of five hundred with care.

Process of drawing upon Copper, to imitate Black-lead pencil, or Chalk.

A remarkable good polish must be put on the copper, with an oil-rubber and crocus-martus well ground in oil; after which it must be cleaned off with whiting, and then rubbed with another clean rag.

You are then to pour over your plate the solution to cause ground which is made as follows:

No. 1. Three ounces of Burgundy pitch, one ditto of frankincense.

These are to be dissolved in a quart of the best rectified spirits of wine, of the strength to fire gunpowder when the spirits are lighted.

During the course of twenty-four hours, this composition must be repeatedly shook, until the whole appears dissolved; then filter it through blotting paper, and it will be fit to use.

In pouring on this ground, an inclination must be given to the plate that the superfluous part of the composition may run off at the opposite side; then place a piece of blotting-paper along this extremity, that it may suck up the ground that will drain from the plate, and in the course of a quarter of an hour the spirit will evaporate, and leave a perfect ground that will cover the surface of the copper, hard and dry enough to proceed with.

With an exceeding soft black-lead pencil sketch your design on this ground, and when finished take a pen and draw with the following composition, resembling ink: if you wish your outline to be thin and delicate, cause the pen you draw with to be made with a sharp point; if you intend to represent chalk-drawing, a very soft nib and broad-made pen will be necessary, or a small reed.

No. 2.—*Composition, resembling Ink, to draw the Design on the Copper.*

Take about one ounce of treacle or sugar-candy, add to this three burnt corks, reduced by the fire to almost an impalpable powder, then add a small quantity of lamp-black to colour it; to these put some weak gum-water (made of gum-arabic), and grind the whole together on a stone with a muller: keep reducing this ink with gum-water, until it flows with ease from the pen or reed.

To make the ink discharge freely from the pen, it must be scraped rather thin towards the end of the nib, on the back part of the quill, and if the liquid is thick, reduce it with hot water.

Having made the drawing on the copper with this composition, you will dry it at the fire until it becomes hard; then varnish the plate all over with turpentine-varnish, (No. 3), of the consistency of the liquid varnish sent with this as a sample.

It will now be necessary to let the varnish that is passed over the plate dry, which will take three or four hours at least; but this will depend on the state of the weather; for if it should be intensely hot, it ought to be left all night to harden.

Now the varnish is presumed to be sufficiently hard, you may rub off the touches made with the foregoing described ink with spittle, and use your finger to rub them up; should it not come off very freely, put your walling-wax round the margin of your plate, and then pour on the touches some warm water, but care must be taken it is not too hot.

The touches now being clean taken off, wash the plate well and clean from all impurities and sediment of the ink with cold *soft* water, then dry the plate at a distance from the fire, or else in the sun, and when dry pour on your aquafortis, which should be in cold weather as follows:

To one pint of nitrous acid, or strong aquafortis, add two parts, or twice its quantity of soft water.

In hot weather, to one part of nitrous acid, add three parts of water.

In every part of this process, avoid hard or pump-water.

The last process of biting in with aquafortis must be closely attended to, brushing off all the bubbles that arise from the action of the aquafortis on the copper.

In summer time, it will take about twenty minutes to get a sufficient colour: in winter perhaps half an hour or more. All this must depend on the state of the atmosphere and temperature of your room. If any parts require to be stopt out, do the same with turpentine-varnish, and lamp-black, and with a camel-hair brush pass over those parts you

consider of sufficient depth; distances and objects receding from the sight, of course ought not to be so deep as your fore-grounds; accordingly you will obliterate them with the foregoing varnish, and then let it dry, when you will apply the aquafortis a second time, and repeat this just as often as you wish to procure different degrees of colour.

Every time you take off the aquafortis, the plate must be washed twice with soft water, and then set to dry as before.

To ascertain the depth of your work, you should rub a small part with a piece of rag dipped in turpentine, and then apply the finger, or a piece of rag rubbed on the oil-rubber, to the place so cleared, and it will give you some idea of the depth.

The walling-wax is taken off by applying a piece of lighted paper to the back of the plate, all round the opposite parts of the margin where the wax is placed, then let the plate cool, and the whole of the grounds, &c. will easily come off by washing the plate with oil of turpentine, which must be used by passing a rag backwards and forwards until the whole dissolves; it is then to be cleared off by rags; and care must be taken that no part of the turpentine is left hanging about the plate.

The plate should only pass once through the press.

Direction respecting Grounds.

No. 1. The ground in hot weather must have an additional one-third of spirits of wine added to it for coarse grounds, to represent chalk; and one-half added to it for fine grounds to represent black-lead pencil; and always to be kept in a cold place in summer, and a moderate warm situation in winter.

N.B.—If any parts are not bit strong enough, the same process is to be repeated.

Gum-water must be made in the proportion of half an ounce of gum-arabic to a quarter of a pint of water.

Turpentine-varnish is composed of an ounce of black rosin to an eighth part of a pint of spirits of turpentine; if the weather is excessive warm, it ought to be made with a sixth part of a pint of spirits of turpentine.

Tracing-rag should be made of a piece of Irish linen, not too much worn, the surface of which is to be rubbed with another rag dipped in sweet oil, just sufficient to retain a small portion of vermillion or pounded red-chalk. This must be placed with the coloured part towards the ground of the plate, and the drawing or tracing laid upon it, which must be traced very lightly with a blunt point or needle.

LIST OF NEW PUBLICATIONS.

AGRICULTURE.

SOME Remarks on the Mildew of Wheat, and the choice of Seed Corn, particularly in reference to an hypothesis of Sir J. Banks, K.B. 2s.

ASTRONOMY.

Evening amusements; or, the beauties of the Heavens displayed; in which the striking appearance to be observed in various evenings during the year 1812 are